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| Title | A Study on Structural and Magnetic Properties of Magnesium Cobalt Zinc Mg0.6-xCoxZn0.4 (Fe1.5Cr0.5)O4 (x = 0.0, 0.2, 0.4, 0.6) Ferrite Nanoparticles | | |
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| Abstract |  |
| Spinel ferrite nanoparticles (NPs) are potential candidates due to their tremendous electrical and magnetic properties. Here, magnetic and physical features of stoichiometry Mg0.6-xCoxZn0.4(Fe1.5Cr0.5)O4 ferrite NPs have been studied where different cobalt content was used. The average particle size was calculated at 4–6 nm. NPs were probed by X-ray diffraction (XRD), vibrating sample magnetometer (VSM), and FT-IR spectroscopy. The molecular vibration band at 560 cm−1 is accounted for the metal–oxygen bond stretching at the tetrahedral site of NPs. The crystal structure of NPs was confirmed by XRD analysis. The magnetic parameters have been decreased for the cobalt content x = 0.2 on ferrite NPs which further increased on replacing magnesium ions with nonmagnetic cobalt ions for higher cobalt concentrations. Moreover, high saturation magnetization and coercivity were observed at 52.29 emu/g and 212 Oe for 0.00 and 0.6 cobalt contents, respectively, on ferrite NPs. In this study, sol–gel method provides an easy synthesis process of Co-doped ferrite nanoparticles at low temperature. | |